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ABSTRACT

This paper presents a definition of distance education and a rationale for it both in pragmatic, problem-solving terms and in relation to a larger view of society. The geographic, political, educational, and technological context of distance education in Canada is then discussed. Traditional correspondence courses, satellite-delivered credit and non-credit courses, teleconferencing, and computer networking/electronic mail for the continuing professional education of teachers in British Columbia are described. A course on the study of exceptional children, which was broadcast live via satellite, is used as a case study to illustrate issues in course production and design, production standards, and cost. The results of pre- and post-course questionnaires covering participant characteristics, attitudes toward exceptional children, attitudes toward telecourses, program quality, live interactive television versus passive viewers, course requirements, and preferred viewing time are summarized, and telecourses are compared with traditional classroom instruction. A discussion of future directions for distance education concludes the paper. (29 references) (MES)

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INNOVATIONS IN DISTANCE EDUCATION APPLIED TO THE PROFESSIONAL DEVELOPMENT OF TEACHERS (A CANADIAN PERSPECTIVE)

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INNOVATIONS IN DISTANCE EDUCATION

In this paper we present in brief compass a definition of distance education and consider a rationale for it both in pragmatic, problem-solving terms and in relation to a larger view of society. We then present in somewhat greater detail an overview of the Canadian context: geographic, political, educational and technological.

Our purpose is to address contemporary innovations in distance education applied to the continuing professional development of teachers. To do that we present applications in British Columbia, Canada's westernmost province, as a case study illustrative of Canadian practice. A satellite-delivered telecourse, focused on professional development needs arising from changes in educational policy and practice, is the main feature of recent developments. These are described in the context of traditional approaches and emerging experiments.

Finally, we reflect on the potential impact of distance education in the professional development and recurrent education of teachers, concluding that with the tools at our disposal, the contributions we can make to equalizing opportunity may be modest but they are not negligible.

DISTANCE EDUCATION

Definition

The literature abounds with definitions of distance education, a term which has emerged in recent years to incorporate the extension to audio, radio, television and telephone communication from a primary dependence on the written word associated with correspondence education. Most definitions are descriptive and seek to differentiate distance education from other forms of education. Sims (1977) uses the more traditional term:

> The unique and distinguishing feature of correspondence education is that the learner is at a distance from the teacher for much, most or even all of the time during the teaching-learning process.

Holmberg (1979) acknowledges the centrality of the separation of teacher and learner to any definition of distance education but gives equal weight to the organizational planning and administrative procedures necessary to support the activity.

Peeters (1983) departs from descriptive definition to take a philosophical position characterizing distance education as "a form of study complementary to our industrial and technological age". He uses the concepts of industrialization heuristically to examine distance education which he sees as reflecting such principles and characteristics as rationalization and division of labour, mechanization and automation, mass production, planning, control, standardization and centralization.

Autonomy of the learner is a major theme in the literature (Moore, 1977; Holmberg, 1979)—autonomy not merely in choosing what to study but in pacing. So much emphasis is given to autonomy that some decry the use of scheduled broadcasts or adherence to an academic term as pacing elements which rob the student of autonomy. Nonetheless all writers recognize the importance of providing the learner with support in the form of well-designed materials, access to tutorial and counselling assistance, and efficient and personal feedback on performance. The pacing provided by scheduled broadcasts and other means may be viewed as merely another form of support.

Keegan's (1980) definition is one of the most widely cited. (cf. Holmberg, 1982.) He stresses six main elements:

> the separation of teacher and learner which distinguishes it from face-to-face lecturing
>
> the influence of an educational organization which distinguishes it from private study

> the use of technical media, usually print, to unite teacher and learner and carry the educational context
>
> the provision of two-way communication so that the student may benefit from or even initiate dialogue
>
> the possibility of occasional meetings for both didactic and socialization purposes
>
> the participation in an industrialized form of education

When Keegan's paper was published in Australia, Baath (1981) responded in the same journal rejecting the last two of Keegan's elements as nonessential.

Holmberg's (1983) concept of guided didactic conversation has given coherence to his writing on distance education for more than two decades. Essentially, he sees as ideal a simulated conversation between the student and the course material and a real conversation between student and tutor. From this concept and its underlying postulates flow helpful guidelines for the production of course materials and the administration of distance education.

Rationale for Distance Education

On a simple, pragmatic level the development of distance education on a large scale can be seen as a response to perceived needs and demands for access to education. Certainly it is a movement which supersedes many cultures and political persuasions. For example in 1972 Brazil through a satellite link between its National Institute of Space Research and Stanford University supported the exchange of technical documents and televised classes. Since 1979 U.S. medical teams link with medical teams in remote areas of Brazil for medical consultation. Indonesia, the South Pacific region and India all have educational programming which uses communications satellites to provide interactive communication among people in distant communities and the Soviet Union is thought to use its Intersputnik system for educational purposes in the German Democratic Republic, Hungary, Bulgaria, Poland, Czechoslovakia, Mongolia and Cuba. Tele-education courses are also being developed for broadcast using the L-Sat (Large Satellite) developed by the European Space Agency. West Germany and France are developing their own experimental programs for satellite delivery and for some time the U.S.A. has utilized satellite technology to provide educational programs, particularly in such sparsely populated areas as Alaska, Appalachia and the Rocky Mountain regions (Buttedahl). The foregoing examples are all drawn from one of the more recent technological developments—the use of communications satellites for distance education delivery. One need only look at the growing list of distance teaching universities, from the Central Broadcasting and Television University in the People's Republic of China to the Universidad Nacional de Education Distancia of Spain and from the Open Universities of Thailand to that of the United Kingdom, to see that distance education has become a major element in the drive to enhance access to education.

Underlying efforts to enhance access to education is the notion that education is one of the keys to obtaining whatever rewards a society has to offer. Woolfe (1977) cites Pratt describing the major objective of the Open University as being "to offer opportunities to educationally underprivileged groups" and Burgess as characterizing its purpose as "to mitigate social inequality".

Many liberal social activists encourage such social engineering in the interests of ameliorating the impact of systematic exclusion and deprivation. The fallacy according to more radical scholars and critics lies in assuming that social mobility will follow from enhancing educational opportunities. These critics observe that the low-paying jobs held by 60 percent of the population in advanced capitalist countries would still be held by 60 percent of the population even if there were a general educational upgrading of the populace and a substantial number would still be condemned to poverty. Such scholars (Karabel and Halsey, 1976) would characterize the development of junior colleges, for example, as a mechanism not for democratizing education but rather for maintaining a class-based tracking system. Similarly the provision of distance education, because it ignores the need to restructure social institutions could be interpreted as a mechanism for social control rather than social change.

Trow (cited in Woolfe, 1977) criticized the objectives of the Open University:

> the roots of social inequality lie in the distribution of property and

> income and are better attacked by social policies aimed at the economic basis of class. It is possible to try to mitigate the social inequalities in educational opportunity, but the further along one moves in the formal educational system, the more one is dealing with the educational consequences of past and present social inequality--and these stubbornly persist.

Reviewing the evidence concerning the Open University's contribution toward reducing inequality, Woolfe (1977) noted that the proportion of working class students increased over the first several years and that if one considered father's occupation as the criterion of social class, a much higher proportion of Open University students (52%) than conventional university students (29%) came from working-class backgrounds. He concluded that although the Open University reflects many of the inequalities found in society, education should not be considered an important force. Not only does the institution serve social mobility but it points towards mass education and thus is capable of contributing to a self awareness which will enable people to challenge the basis of an economic system which produces inequality and deprivation.

Later in this paper we present examples of distance education activity in British Columbia, Canada, particularly in the continuing professional development of teachers. While teachers in general are not an underprivileged segment in the Canadian socio-economic context, obtaining further education, training and advanced degrees is highly valued and is a major pathway to higher salaries, leadership positions and higher status within the teaching profession. In this sense continuing education is an important vehicle used by teachers to obtain social rewards and to provide equal access to continuing education for British Columbia teachers is an obvious reason for promoting distance education. In the British Columbia context differential access is illustrated graphically in the fact that although the province has an extensive system of universities, colleges and institutes, the higher education participation rate for young people from non-metropolitan areas is exactly half that for the metropolitan areas. Distance education is seen as an important element in equalizing access. For a university in a metropolitan area, distance education is a desirable alternative to fly in/fly out approaches to in-service education. It provides a coherent mechanism for placing additional power in our clients' hands in the form of knowledge and skills, and properly used, it is less expensive than itinerant teaching.

THE CANADIAN CONTEXT

Geographic

Canada is a large country, second only to the U.S.S.R. in land area. Indeed, Canada is slightly larger than Europe. It stretches over 8,000 kilometres from Atlantic to Pacific and more than 4,400 kilometres from the United States border to the north pole. However, the great majority of its 25 million people live within 300 kilometres of its southern border.

Although Canada's two official languages are English and French, immigration has contributed to rich cultural and linguistic diversity. For example, in Vancouver, Canada's major Pacific coast city, almost half the school children come from families whose first language is neither English nor French but one of more than fifty other languages.

The province of British Columbia is Canada's third largest. Sixty per cent of its 2.75 million people are concentrated in the southwest corner of the province in the Lower Mainland surrounding Vancouver and on southern Vancouver Island around Victoria, the provincial capital. Since most of B.C.'s one million square kilometres stand on edge the remaining 40 per cent of the population is in many centres separated by vast wilderness areas.

The climate of British Columbia's southwest coast is moist and moderate, that of the central interior less so, while the province's northern interior experiences extreme contrasts between summer and winter.

Political

Canada's federal system, maintained in its new 1982 Constitution, incorporates a division of powers between a federal government and the governments of ten provinces. Territorial governments in two northern territories have less autonomy than the provinces and we are still exploring whether it is feasible for various aboriginal peoples to constitute "nations within a nation". Immigration is a shared power which all but one province leave to the federal authorities. Communications is also shared but again the federal government plays the dominant role. Education, on the other hand, is explicitly a provincial responsibility although the federal presence is felt in relation to official language policy and in the funding of higher education which is seen as a matter of national interest. Funds for higher education are, however, transferred from the federal to the provincial governments and provincial allocations to the universities and colleges may not be commensurate. Nevertheless most educational initiatives are provincial.

Successive governments in British Columbia have supported policy initiatives designed to improve access to education. Genuine idealism has often been a motivating factor but it is not irrelevant that it requires the support of fewer electors to return a representative to government from a rural region than from an urban one. Access to services including education may well be worth votes.

Educational

More than half a century ago British Columbia experimented with the use of radio in education extension, adding that medium to a correspondence program. Institution building was the preoccupation of the 1960's as the number of provincial universities jumped from one to three and a system of colleges and institutes was established.

The 1970's, in spite of changes in government in 1972 and 1975, saw a continuous emphasis on the development of communications policy and an interest in finding ways of overcoming social and geographic barriers to learning. Only one college, however—North Island College—"fully accepted the challenge and established itself as an open learning system using a learning centre approach with no central campus" (Forsyth and Collins, 1983). Satellite-tele-education experiments were launched in 1977 using Hermes, a joint venture of NASA and the Canadian Department of Education. In a two-month period universities and colleges broadcast sixtyfour hours of colour programming with provision for instructor/student interaction via a telephone linkage.

The Open Learning Institute was established in 1978 as a distance teaching institution. It gave primary emphasis to correspondence courses with adjunct audio and video cassette materials and telephone tutoring. Two years later the Knowledge Network was founded, not as an educational institution per se but rather as a telecommunications network. By this time Canada's own Anik-B had been in place two years in geostationary orbit·36,000 kilometres above the earth. Signals beamed to the Anik-B could be received anywhere in its "footprint" using inexpensive receiving dishes. Broadcasts originating in Vancouver could be received throughout British Columbia, the Yukon Territory and in portions of the neighbouring province Alberta, and the Northwest Territories. Initially receiving stations were established in regional centres, often at a college or secondary school.

Recently an interactive television microwave network has been established to link institutions. Primary applications are the linking of the teaching hospitals with the University of British Columbia's Health Sciences Centre and the law courts with the Faculty of Law at the University of British Columbia and the Department of Criminology at Simon Fraser University. Linkages between the universities have thus far been used only experimentally.

Technological

In describing the emergence of new institutions and the linking of existing ones we have alluded to the technology in use. The Knowledge Network now uses the ANIK-C 14/12 Ghz satellite (Canada's new satellite launched by the space shuttle "Columbia" in December 1982), microwave and broadband cable. On its public television service, the Knowledge Network presently provides 98 hours of programs a week to 150 communities. The colleges, institutes and universities, individually and collectively, develop and broadcast programming with the cooperation of the Knowledge Network.

In a mountainous region like British Columbia satellite transmission offers the advantage of

eliminating the need for complex microwave and/or cable relays. Relays known as transponders receive signals and beam them back to the earth. Each transponder can relay one television channel on 1,200 voice channels (Smith and Stroud, 1980).

Knowledge West provides the capacity for closed-circuit satellite videoconferencing, data networks and electronic publishing. Its broadband closed-circuit service links institutions with two-way video, audio and data units (Forsythe and Collins, 1983).

DISTANCE EDUCATION ACTIVITIES IN THE CONTINUING PROFESSIONAL DEVELOPMENT OF TEACHERS

Twenty-eight thousand teachers staff British Columbia's elementary and secondary schools. Continuing professional development opportunities vary greatly when one contrasts the concentration of more than 10,000 teachers in the Greater Vancouver region with the dispersion of 3,000 teachers in the Central and Northern Interior over an area greater than the size of France. Distance education has long been attractive as a means of providing access.

Traditional Correspondence Courses

In the 1950's and 60's the universities faced the challenge of training enough teachers to staff schools bursting with the children of the post-war baby boom. The University of British Columbia mounted one- and two-year "emergency" programs for elementary teachers. Indeed, many partially trained teachers taught in high schools as well. These teachers worked toward degree completion through every means available. Summer sessions had huge enrolments and extramural courses were taught by fly-in/fly-out instructors with extra classes to make up for those cancelled when weather grounded flights. A constant element for many was the correspondence course—either academic or professional in emphasis—with its duplicated "papers", extensive reading and often-delayed communications via rural mail service.

By 1970 most teachers entering the profession held baccalaureate degrees and their need for undergraduate correspondence courses was less than that of their older colleagues.

Successive revisions of correspondence courses have led not only to relabelling them but to the emergence of guidelines for their development. Curriculum developers assist faculty members in the process and audiovisual adjunct materials enhance the presentation of course material. The addition of telephone tutoring is yet one more factor in enhancing the quality of what Holmberg describes as "guided didactic conversation" (1980, 1982).

At the University of British Columbia four courses of the Adult Education Diploma Program (Institutions of Adult Education; Developing Short Courses, Workshops, and Seminars; Introduction to Adult Education; and History of Education) are offered by Guided Independent Study. The university, with support from the Canadian International Development Agency, is presently offering this Diploma Program in Portugese in northern Brazil and plans are underway to offer it in Hong Kong and Singapore.

Satellite-delivered Credit Courses and Non-credit Material

In 1980, when access to satellite technology was first provided, the University of British Columbia immediately began developing material for presentation on the public service educational TV network. The Faculty of Education was quick to respond with both credit and non-credit programs aimed at the professional development of practising teachers. At present the University has completed four frequently requested credit courses. The content of these courses includes special education, counselling and micro-computer applications in the classroom and plans are underway to develop a flexible post-baccalaureate diploma program using a combination of print, audio and video material. While the credit courses described above were produced with educational television in mind, the programs are also delivered as individual study courses by mailing print and video packages to students, and they are also used for workshops and seminars both on and off campus.

In addition to the credit courses described above, each year the University produces a variety of non-credit activities on educational television for educators throughout the province. In 1982 the University participated in the North American Teleconference on Micro-computers. It involved inter connections between three Canadian universities and sixteen universities in the United States. The

purpose of the teleconference was to share information concerning micro-computer applications in the classroom and to explore the feasibility of telecommunications between educational institutions in North America. In British Columbia the teleconference was combined with a one-day workshop that involved representatives from local schools, universities, colleges, the Ministry of Education and the provincial teachers' association. Representatives from every constituency expressed an interest in further exploring the use of teleconferencing. In British Columbia, 53 people participated in the one-day workshop. Throughout North America, it was estimated that 15,000 people participated. The cost to British Columbia for participation was $4700. One can easily see the financial advantages for information sharing using this technology that involved one-way video transmission from Ohio State University, the originating site, to all participating sites and audio interconnections between all participating organizations. In general, it was considered to be a successful experiment.

Another illustration of teleconferencing was the B.C. Teleconference on Young Writers conducted in 1983 as a joint venture between the University of British Columbia and the Ministry of Education. The purpose of the project was to implement in local schools new curriculum material to stimulate writing across the curriculum. Initially, representatives from various regions in B.C. were brought together to learn the writing process and familiarize themselves with the curriculum material. Next, regional representatives from eight different locations were connected with an audio bridge to plan eight regional conferences. Finally, a one hour program was presented on educational television that included live interactive segments and pre-recorded video segments from the Young Writer curriculum package. One-day regional workshops designed to train additional teachers followed the broadcast. One of the significant features in presenting this material on public television was that although the material was aimed at teachers, parents and children also had access to the material.

Teleconferencing

Teleconferencing refers to the use of telecommunication systems that enable a group of three or more people, at two or more locations, to communicate with one another. Three different forms of communication are usually included as teleconferencing: video-conferencing, audio-conferencing and computer conferencing. In the foregoing illustrations, attention has been focused on one-way video transmission and two-way audio-conferencing. Audio-conference users may operate from telephones in any location or they may assemble in conference rooms that have special equipment. For audio-conferencing, users need telephone equipment with microphones and listening devices called convenors. For two or more persons at a location, conference telephone sets with loudspeakers are often used. A conference bridge is needed when there are more than two locations. A bridge interconnects the transmission circuits from each location. With this equipment participants at every site can communicate directly with each other. It should be pointed out that successful audio-conferencing requires careful organization. In particular, like any well conducted meeting, there must be a chairperson with a clear agenda who directs the proceedings. Participants should be briefed concerning protocol and concerning the use of equipment. The advantage of audio-conferencing is that it is relatively cheap and easy to use.

Audio-conferencing using a telephone bridge was used to prepare on-site workshop staff for the British Columbia Teleconference on Young Writers described above. Four to eight people were present in conference rooms in eight different locations in British Columbia. A chairperson in the conference room at the University of British Columbia directed the interactions between the forty participants. The outcome of a 1½ hour session was thoroughly briefed, onsite staff to conduct local one-day workshops that accompanied the teleconference. The total cost of the audio-conference was $450.00. To have conducted such a training session in Vancouver would have cost aproximately $8,500.00.

Throughout Canada recent reviews of pre-service teacher education programs have resulted in recommendations that the professional phase, whether undergraduate or post-baccalaureate, be no less than two academic years in length and include an extended practicum of thirteen weeks or more. A common concern is that the theory/practice relationship be strengthened. Teacher education institutions and representatives of the teaching profession are re-examining their partnership and one by-product is a reaffirmation of the importance of the sponsor teacher's role in teacher education. As a result some institutions, notably the University of Saskatchewan, are revising the role of university personnel to de-emphasize the direct supervision of student teachers. Instead the University will concentrate on enhancing the role of the sponsor teacher—selection, training for supervision, orientation, coaching and liaison—all designed to acknowledge the centrality of the sponsor teacher

in the student teaching enterprise and to maximize effectiveness.

Frequently student teachers are scattered among many schools and districts. Indeed, exercising greater selectivity in the choice of sponsor teachers will make it even less likely that many student teachers (and therefore sponsor teachers) will be concentrated in one building. But sponsor teachers can learn from each other's experience. One recent approach has been to schedule teleconferences with a dozen sponsor teachers in their home districts and one or two university resource people. Sponsor teachers, who have undergone earlier training in clinical supervision, are invited to share their supervisory experiences and the opportunity to consider critical incidents and to learn from the experience of colleagues. The technology of audio-conferencing allows a group to be reconvened—at modest expense and over long distances and is, therefore, playing an important role in the movement to enhance the role of the profession in the induction of new members.

Computer Networking and Electronic Mail

At this time all seventy-five school districts, the provincial School Trustees' Association, the Teachers Federation and the Ministry of Education have access to each other and to a variety of institutions in other provinces through a computer network. Many of the applications relate to administration and to collective bargaining and could be characterized as electronic mail. Additionally, computer network conferencing takes place within particular groups of specialist teachers. Using this technique any network member can access the computer file, read messages added and reply or send messages to others. In some districts teachers use the computer network as a means of gaining access to model lesson and unit plans and shared resources for teaching.

One such network in British Columbia involves a group of educators and students who share information with each other in the area of thinking skills. The project is co-ordinated by the Focus on Thinking Foundation which is located in the small British Columbia community of Invermere. Membership in and access to the network cost $10.00 and at this time there are approximately 300 members scattered throughout North America. Material in the information system is organized into thirteen different topic areas and members may add information to the files or retrieve material already in the system. The information system will work with any computer make or model that is equipped with a modem and the material is then available for the price of a phone call. The only disadvantage to the system is that long distance tolls may be heavy if the user requests a hard copy of the material. In order to overcome this problem, the project co-ordinators are exploring the possibility of establishing regional centres in different areas of North America and then exchanging discs with those centres which would be closer to the users, resulting in lower telephone rates.

DISTANCE EDUCATION VIA SATELLITE: A CASE STUDY

The University of British Columbia's response to the professional development of teachers, particularly those needs brought about by the trend to integrate children with handicaps into regular classrooms, is used as a case study to illustrate contemporary applications of distance education, to describe issues in course selection, development and design, and to report the reaction of participants to a telecourse.

Need

The first issue facing the University as it moved into telecourse production was to identify areas of high need in the field and then, out of approximately 1,200 courses listed in the calendar, select material for production. Whereas teachers' interests in degree completion, both for academic and for salary purposes, provided much of the impetus for earlier distance education programming, more recently the impetus has arisen from changes in public policy affecting teachers.

> The provision of care and treatment for people with handicaps has undergone major changes in recent years. In the past, many children with handicaps were forced to leave their home communities in order to obtain services related to their handicapping conditions. These services were usually provided in specialized facilities that contained colonies of persons with handicaps. Parents who kept their handicapped children at home were faced with limited support. Services that non-handicapped children

took for granted such as child care, education in public schools, recreation and other support services were often denied for persons with handicaps. If services were available locally, they were very limited and were commonly provided in special, segregated settings.

Powerful social, political, legal and ideological forces are bringing about significant changes for persons who live with handicaps. First, efforts are being made to keep persons with handicaps in their home communities. Second, an increasing number of agencies that serve non-handicapped persons are opening their doors to persons with handicaps. In many areas, local schools are leading the way. In schools, the trend is to integrate students with handicaps into regular schools where students with handicaps join non-handicapped students in a limited number of classes and activities. An increasing number of students with handicaps are showing up in regular classrooms where their education and training is the responsibility of the regular classroom teacher.

As the Special Education doctrine of integration spreads, many regular classroom teachers are recognizing the need to become more familiar with the characteristics of children with special educational needs and the teaching and learning procedures that have been developed in special education.

Unfortunately implementation of the mainstreaming policy has coincided with a period of fiscal restraint in public education. Therefore, specialized support services have not developed as they might otherwise to provide the classroom teacher with assistance in meeting the special needs of particular pupils. This has resulted in a growing demand for access to training in special education for regular classroom teachers who lack training in special education but who are working with children that have special needs. In recent years the Faculty of Education has received numerous requests to provide training in special education for practising teachers. Recognizing the limitations of traditional correspondence courses and itinerant off-campus instructors, the Faculty of Education looked to television in an effort to provide quality distance education that is readily available to all practising teachers throughout British Columbia. In the fall of 1980, the Faculty of Education gave priority to developing for live, interactive broadcast at 1.5 unit course entitled "An Introduction to the Study of Exceptional Children". The experience of presenting this course on educational television is used to illustrate issues in course production, design and delivery.

Course Production and Design

In order to produce video components for the courses, financial resources were provided by the Ministry of Education and the University of British Columbia. Within the University of British Columbia, three organizations co-operated to plan, produce and deliver the courses. Within the Faculty of Education the Field Development Office is responsible for providing professional development activities for practising teachers. This office provides overall direction for the production of distance education activities including needs assessment, budgeting, project co-ordination, advertising and delivery. For the development of content, the Field Development Office purchases services from academic staff, in this case instructors from the field of special education who produce course outlines and manuscripts containing academic material. The production of finished print material, including a student guide and video material, is the responsibility of the Audio/Visual Services Department. They provide production staff to produce video material and editors to compile and package the print information.

The courses are offered for credit and for audit—both of which require that students adhere to the standard admission and registration requirements of the university. In many ways, the course described in this paper is similar in its design to the course as it is taught on campus. Like campus courses, it includes fifteen sessions with three introductory programs, two concluding sessions and ten programs covering hearing impairments, visual impairments, physical impairments, mental retardation, learning disabilities, behaviour disorders, health problems, speech and language disorders, cultural differences, and gifted students (Neufeld and Ratzlaff, 1982).

Since the broadcasts began, the course has been delivered in three different ways. Initially, broadcasts consisted of sixty minutes of pre-recorded material and sixty minutes of interviews and live interactive segments. Scarce air time resulted in reducing live time to thirty minutes and recently, interaction with students has been eliminated from the live television programs and has been handled by toll free telephone access following the program. A typical format for a ninety minute program that includes an interactive segment is shown below.

Nature of Activity:	Program Activity:	Approximate Time:
Live Introduction	Announcements Introduction of content	5 min.
Pre-recorded	Philosophy and underlying theory	28 min.
	Characteristics of students with special needs	
Live Segment	Interviews with studio guests	13 min.
	Questions and comments from viewers	
Pre-recorded Material	Programs and services for students with special needs	28 min.
Live Segment	Interviews with studio guests	13 min.
	Questions and comments from viewers	
Live Conclusion	Summary, wrap-up and introduction to next week program	3 min.

Each series has a host to introduce and summarize the program, conduct interviews and respond to questions from viewers who call the studio.

Print resources for the courses include a Student Guide and a text. The Student Guide contains an outline of the course, instructions for the students, notes for each television program, additional reading references, and a description of reading and writing assignments. Program notes were developed after students complained that it was difficult to take notes and absorb the content of the pre-recorded segments. Each course contains ten weekly written assignments, a major term project and a final two-hour open book examination. Weekly assignments are graded and returned to students as quickly as possible. Depending on postal service, turn-around time is three to five weeks. While traditional correspondence courses report high attrition rates, drop-out rates in these telecourses have been negligible. It is speculated that regularly scheduled weekly telecasts and weekly assignments combine to provide a pacing function that motivates students. Student reactions to education using television suggests that there are additional motivating factors inherent in television that may account for high completion rates in the courses. These factors are discussed under evaluation.

Production Standards and Cost

Three of the major variables in projecting the cost of programs for educational television are production standards, and the amount of on-site documentary material and editing that is required. At this time some of the most sophisticated video material in educational television is produced by the United Kingdom Open University and the BBC. Their productions meet the standards of commercial television. They

employ large professional, specialized staff and use sophisticated studio and documentary procedures. Their facilities and equipment are both extensive and expensive. On the other end of the continuum is the approach used by the off-campus engineering degree program offered by Stanford University. In their television classrooms they use a camera in front of an instructor to distribute live, to other locations, or to record traditional classroom lectures. Using this approach, little or no editing is required. The production approach used at the University of British Columbia falls midway between the Open University and the Stanford models and could be described as an illustrated approach. In designing a course, a major effort is made to utilize the strengths of the television medium. Appropriate graphics and models are constructed and used. For example, in producing the introductory telecourse in Special Education described in this paper, on-site documentation of exceptional children integrated into regular classrooms was video-taped along with interviews with children, their teachers, parents and various resource people. Examples of services available were also shown. With this production approach in mind, the following staffing pattern, equipment needs and cost estimates are presented to illustrate the resources needed to produce the equivalent of a 1.5 unit course that consists of print material and ten thirty-minute video segments.

1. Content and Print Production: In order to develop print material, a content specialist, usually an instructor from an academic unit within the University, is recruited to develop a blueprint for the course and a manuscript. A blueprint consists of a detailed outline for the course and the first chapter of a series. It is estimated that ten days are required for this task. If the materials that are generated meet the standards for the course, then manuscripts are requested for the remainder of the course which consists of ten to fifteen separate lessons. Next, these materials go to a designer editor, who produces a finished copy of the lessons and a student guide which includes instructions for participants. Ideally, this material is complete before video-taping begins. Approximately $7,400 is set aside for this stage of the production process.

Estimated Print Production Cost For 1.5 Unit Course *

Activities:	Personnel:	Days:	Approximate Cost:
Blueprint	Content Specialist	10	
Manuscript	Content Specialist	30	$4,400
Print Production	Designer/Editor	20	3,000
			$7,400

*At the University of British Columbia, a typical 1.5 unit course meets for 39 hours during a 13 week term.

2. TV Production: TV production consists of scripting, on-site video-taping, studio activities and editing. Equipment that is used for location and studio production consists of 1/2 inch M-format (Panasonic Program). Original material is produced in 1/2 inch M-format, 1/2 inch M-format for the edited master and one inch C-format for the broadcast master. Although every project is unique, the following budget is useful as a guideline to anticipate the resources that will be needed for each thirty minute program in a teleseries. According to the figures below, each program will cost approximately $4,150. Video-tape production costs for a series of ten programs will amount to $41,500.

Estimated Cost for One 30 Minute Video-tape

Activity:	Personnel:	Days:	Approx. Cost:
Script writing/directing	Producer	10x(150)	$1,500
On-site video-taping	1 Technician	2x(40)x7.5 hr.	600
	1 Technician	2x(20)x7.5 hr.	300
Studio activities	1 Director	1x(40)x7.5 hr.	300
	1 Audio Technician	2x(20)x7.5 hr.	150
	1 Floor Manager	1x(20)x7.5 hr.	150
	1 Camera Operator	1x(20)x7.5 hr.	150
	1 Camera Operator	1x(20)x7.5 hr.	150
Editing	1 Technician	2x(40)x7.5 hr.	600
Supplies and *Expenses			250
			$4,150

*Video documentation that involves considerable travel expenses may inflate this figure.

3. Total Production Costs: Using this illustration, a 1.5 unit course involving ten to fifteen print lessons and 10, 30 minute video tapes would cost approximately $48,900. Once a tele course has been produced, it costs approximately $5,000 for a tutor and markers to deliver the course on educational television to 100 students. At the rate of 100 students per offering, the University would need to offer the course to 600 students or six times (6 X 100 students) in order to recover the initial investment. These calculations do not include the overhead costs (often estimated at 15 percent of a project) for planning, administration and management. With this in mind one should plan for material to have a shelf life of approximately six years without having to make major revisions. Additional ways to recover production costs are to sell or rent materials and to make use of the material at the University to reduce instructional costs on campus.

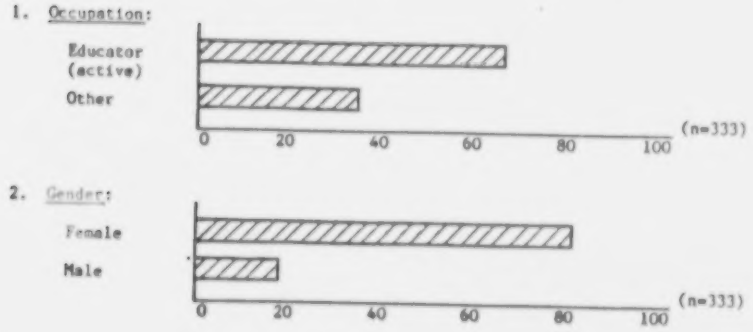
COURSE EVALUATION

The importance of formative feedback for the tele-series was recognized from the very beginning. Pre- and post-course questionnaires were developed and distributed to each student participating in the course for credit. The pre-course questionnaire consisted of Part A: Participant Characteristics, Part B: Participant Beliefs Concerning People with Handicaps, and Part C: Evaluation, which was added to the post-course questionnaire. The following material is a summary of information obtained from pre-course and post-course questionnaires submitted by persons registering for the course during the period April, 1981 to April, 1983. All data is reported in percentages and the total n is given for each item.

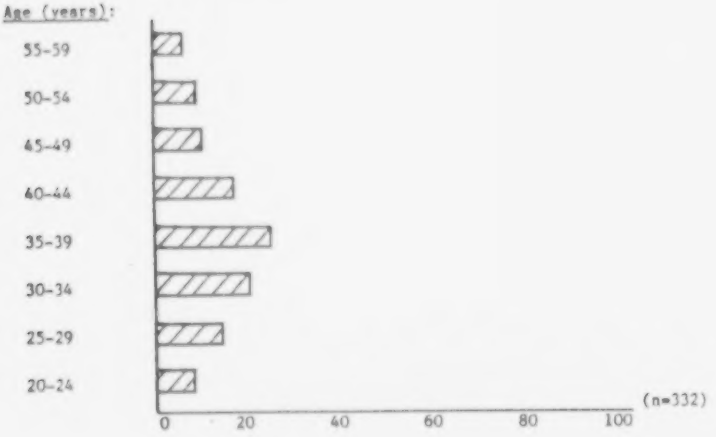
Participant Characteristics

The first part of the questionnaire requested information regarding participant characteristics. Four of these characteristics (i.e. present occupation, gender, age and marital status) are described in Figure 1. It is interesting to note that, although the course was prepared and developed with educators in mind, more than 1/3 of the people who took the course for credit came from other occupations (see item 1, Figure 1). This information is consistent with the observation that, during the live interactive segments of the broadcasts, the majority of the calls that were received came from people who were not educators and who were not registered in the course. Interested non-credit viewers included the parents of children with special needs and people from other areas of human service endeavour such as social workers. It is worth noting that telecourses in education are of interest to, and provide a service for, the general public. Unfortunately, we lack the ability to evaluate the degree of impact made on the general public by these programs. Of the people who took the course for credit, most participants were in their thirties; females out-numbered males 4:1 and 3/4 of all students were married.

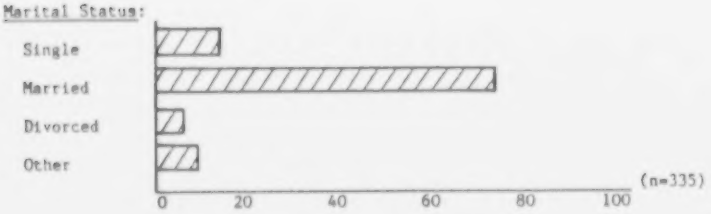
Figure 1: Course Participant Characteristics (Percent)



3. Age (years):



4. Marital Status:



Participant Attitudes Toward Children With Special Needs

One reason for selecting this course for broadcast on educational television was to support new government policies aimed at integrating children with special needs into regular classrooms and one objective of the course was to promote the value of placing children with special needs in regular classrooms rather than in segregated settings. Part two of the questionnaire requested information regarding participant beliefs with regard to exceptional children. The same questions were asked three months apart: at the beginning and at the end of the course. In this way an effort was made to find out if the beliefs of participants had changed after they had taken the course. The first item asked participants to select the appropriate setting for each of ten specifically named exceptional children. The categories RS, SD, AH, SC and NC are arranged from most restrictive settings (RS-residential school) to least restrictive settings (NC-normal class). Although the percentage differences are small in some categories (comparing pre-test to post-test scores) every category a to j indicates some change in the desired direction from the most restrictive to the least restrictive setting (see Figure 2). This information lends weight to the argument that teacher attitudes can be influenced through instruction via satellite.

Participant Attitudes Toward Telecourse

Home-based vs. Centre-based: The University of British Columbia offered its first telecourse in January of 1981. At that time the satellite signal did not reach into every corner of British Columbia and teachers were compelled to travel to regional centres to view the programs. Regional centres were located at community colleges or local schools. Local instructors or contact persons were designated to co-ordinate student activities and lead discussions at each site. Many teachers were unable to enroll in the course because they did not live within commuting distance of the receiving sites and many other teachers travelled long distances in order to participate.

By September, 1981 the majority of British Columbians could receive educational programs on their home television sets. Following this change in technology, students were no longer required to view the programs at regional centres. At that point, participation in the telecourse more than tripled and students from every corner of British Columbia were taking courses for credit. According to our most recent findings, seventy-eight percent of the students who enrolled in the courses for credit watched the programs in the comfort of their own homes. From a technical viewpoint this change addressed two major issues in distance education: first, access to education and second, the autonomy of the student. Although programs were regularly scheduled on public television every week, the automony of students is reflected by the fact that only fifty-two percent of the students watched the live presentations. They now watch the programs at home and when it is convenient for them. Viewing programs in the comfort of one's own home may be a contributing factor to the positive ratings give to telecourses in areas such as physical comfort, lack of stress, motivation and attitude toward learning (see Figure 7).

Figure 2

most restrictive

least restrictive

RS: residential school
SD: special day school
AH: at home (parent or visiting teacher)
SC: special class in public school
NC: normal class in public school

Exceptionality	most restrictive				least restrictive	most restrictive				least restrictive
	PRE					POST				
	RS	SD	AH	SC	NC	RS	SD	AH	SC	NC
a) totally deaf	4	16	0	24	56	1	9	0	16	74
b) totally blind	4	20	0	23	53	2	9	0	18	71
c) gifted	0	1	0	17	82	0	2	0	11	87
d) mentally retarded	4	21	0	50	25	2	9	0	48	41
e) physically handicapped	1	4	1	12	82	0	2	0	10	88
f) emotionally disturbed	6	16	1	40	37	3	12	1	39	45
g) health impaired	2	3	33	5	57	0	2	26	4	68
h) speech/language disorders	1	2	0	17	80	0	2	0	11	87
i) behaviourally disordered	5	9	1	37	48	2	7	1	40	50
j) learning disabled	2	1	0	21	76	0	0	0	14	86

Program Quality

Programs that the University of British Columbia wishes to present on the public service system of the Knowledge Network must meet their production standards. It has already been pointed out that the approach used by the University of British Columbia is an approach that stands midway between standards used by the British Open University and Stanford University where they video-tape classroom lectures. Using the U.B.C. approach, eighty-nine percent of the participants rated the audio portions of the series as good to excellent, and eighty-three percent rated the video components as good to excellent. From this reaction, one might conclude that the U.B.C. production approach is acceptable from an educational design viewpoint.

Figure 3

Quality of program:

	Poor	Fair	Good	Very Good	Excellent	n
a) audio	1	10	33	32	24	222
b) video	3	14	28	30	25	222

Live Interactive Television versus Passive Viewers

In a list of ten items comparing instruction by television to traditional classroom instruction, traditional classroom instruction is rated as superior to instruction by television in two categories: instructorstudent interaction, and student-student interaction. One procedure that has been used to facilitate interaction between students and between students and instructors is live interactive television. When this introductory program in special education was first shown in 1981, the program contained sixty minutes of pre-recorded material and sixty minutes of live interactive television. In 1982 and 1983, the live interactive segments were reduced to thirty minutes per program. In our most recent teleseries, we have eliminated live interactive television completely, replacing it with toll free telephone calls following the programs. The rationale for this decision was scarce air time and the survey information which reported that only twenty-seven percent of the students taking the course for credit called the studios. Judging from the reaction of the students in our most recent survey, the decision to eliminate live interactive segments from the programs may have been a backward step. In spite of their low response rate to the opportunity for studio calls (twenty-seven percent), eighty-nine percent of students considered the interactive segment to be useful, ninety-three percent of the students reported that it was informative and seventy-eight percent stated that it was necessary. Many of the studio calls that were received during the program came from interested members of the general public who were not taking the course for credit but who were interested in the material. Many students who failed to call the studios during the program took advantage of toll free access to contact the instructor after the programs. This may reflect shyness or fear of exposure to the general public and unseen classmates. In actual fact, the frequency of student-instructor interaction on television (twenty-seven percent) may not differ significantly from student-instructor interaction in a large classroom on campus. Also, one should keep in mind that only fifty-two percent of the students taking the course for credit watched the live broadcasts. Thus, approximately half of the students who watched the live programs called the studios. Looking back to the centre-based model that was used when this telecourse was first offered, it should be noted that a larger percentage of the students called the studios when they met in regional groups. This may reflect the security that one feels when the relevance of a comment or a question has been checked with other members of a small group. Information is not yet available concerning student reactions to the teleseries since the elimination of live interactive television which has been replaced by toll free telephone access to the instructor on a regularly scheduled weekly basis.

Figure 4

Interactive (telephone) phase:

	Strongly Disagree	Disagree	Agree	Strongly Agree
a) Useful	2	9	53	36
b) Informative	1	9	53	40
c) Necessary	5	17	37	41

Number calling: Yes - 27 No - 73 (n = 190)

Course Requirements

In order to obtain credit for this course, students must gain admission to the University and register in the course through regular channels. Course ingredients consist of fifteen hours of pre-recorded video-taped programs, weekly readings in assigned texts, ten weekly assignments, a major term paper and a two hour take home final examination. During a 1.5 unit course on campus, students meet with an instructor for approximately thirty-nine hours. However, it is generally agreed that content presented on video tapes is much more dense than instruction in the classroom. For this course, content that is normally presented in thirty-five to thirty-nine hours on campus is presented in fifteen hours of video tapes which include appropriate graphics, interviews with teachers and students and illustrations from classroom settings. The Student Guide received a particularly high rating by students. The major purpose of the Student Guide is to provide instructions for students concerning the use of course materials and other resources that are available. It also contains assignments and program notes that summarize content from the video tapes. Overall, seventy-nine percent of the students rated the course load as acceptable to very acceptable.

Figure 5

Course Requirements:

	Very Unacceptable	Unacceptable	Acceptable	Very Acceptable	n
a) Registration	1	4	53	42	274
b) Assignments	3	11	54	32	271
c) Examinations	3	5	63	29	269
d) Course Load	8	13	51	28	263
e) Text 1	2	5	54	39	208
f) Text 2	10	10	61	19	133
g) Student Guide	0	1	17	82	242

Preferred Viewing Time

The first broadcasts of this course in 1981 took place between 9:00 a.m. and 11:00 a.m. every Saturday morning for 15 weeks. At that time participants were required to watch the live programs. Since that time, the series has been televised on Wednesdays, 4:00 p.m. to 5:00 p.m. and on Fridays between 4:00 p.m and 7:00 p.m. Although programs are regularly scheduled on public television every week, only fifty-two percent of the students in our last survey watched the live presentations. A small number of these students reside outside the satellite footprint but the majority have the programs taped and watch the programs when it is convenient for them. In this sense distance education students are exercising autonomy in ways that depart from campus classroom traditions.

Autonomy of the learner is a major theme in distance education literature (Moore, 1977; Holmberg, 1979)—autonomy not merely in choosing what to study but also when to study and at an individual's own pace. So much emphasis is given to autonomy in the distance education literature that some writers deplore the use of scheduled broadcasts or adherence to an academic term as pacing elements which rob the student of autonomy. The viewpoint of the authors in this paper is that weekly pacing, through

regularly scheduled broadcasts, is an important factor in the negligible attrition rate of telecourse students compared to correspondence students. However, since many students now record the telecasts and watch the programs at their own convenience, the scheduling of broadcasts is of less importance. For students who watch the broadcasts we discovered that they had a first preference for viewing telecourses on Monday, 3:30 to 6:00 p.m. and a second preference for Tuesday, 3:00 to 6:00 p.m. If it is desirable for students to watch the live telecasts, then an effort should be made to broadcast the programs on Mondays between 3:00 and 6:00 p.m. If the programs include live interactive segments, then it is important to have students participate in the live programs in order to receive their comments and questions on the air.

Figure 6

	M	T	W	Th	F	S
	42	27	18	5	8	0

b) Time:	8-12	1-3	3-6	6-10	
	0	4	61	35	n=74

Comparison of Telecourses to Traditional Classroom Instruction

Perhaps the litmus test of any distance education activity is how, in the opinion of students, it compares to traditional classroom instruction. It should come as no surprise that when students compared this telecourse to traditional classroom instruction, the telecourse was inferior on two dimensions: instructor to student interaction and student to student interaction. Other categories that were measured included attention or alertness, rate of presentation or pacing, ease of note taking, use of visual aids, motivation to work, attitude toward learning, physical comfort and stress. In each one of these categories student attitudes were significantly more positive toward distance education using television, than toward direct instruction in the classroom. Although there are many techniques that can be used to improve student to student and instructor to student interactions, it is predictable that direct instruction will always be superior to distance education in these two categories. If there is effective communication between people, there is no substitute for direct encounter. However, when all of the factors are taken together, television instruction appears to be an acceptable alternative to direct instruction in the classroom. One of the powerful advantages of television instruction is the ability to present a variety of classroom demonstrations to the students in support of instructional theory. In the category of visual aids ninety-six percent of the students rated television instruction the same as or superior to classroom instruction. Eighty-five percent of the students reported that they were as alert or more alert, eighty-seven percent were equally or more motivated and ninety-five percent reported that they had a similar or more positive attitude toward learning by television than by traditional classroom instruction.

Figure 7

Comparison to Classroom:

	Much Worse	Worse	Same	Better	Much Better	n
a) Instructor-student Interaction	15	50	26	7	2	259
b) Student-student Interaction	27	39	18	10	6	260
c) Attention (Alertness)	2	13	42	31	12	267
d) Pacing (Rate of Presentation)	2	14	33	38	13	264
e) Ease of Note-taking	1	7	20	36	36	267
f) Use of Visual Aids	0	4	14	39	43	268
g) Motivation to Work	2	11	54	21	12	266
h) Attitude Toward Learning	1	4	56	25	14	270
i) Physical Comfort	0	2	16	34	48	270
j) Experienced Stress	1	9	34	28	28	261

FUTURE DIRECTIONS

The use of distance education technology in the form of audio, video and satellite communications has been a positive experience in the professional development of teachers at the University of British Columbia. With added experience, and as more efficient production procedures are developed, the Faculty of Education anticipates that professional development activities for practising teachers throughout the province can be delivered at less cost than by using itinerant instructors. At the same time it has been demonstrated that inividual, repetitive activity can be eliminated through the use of new distance education technologies. However, as new technologies evolve, new problems emerge. When the first telecourse was produced, there was a plethora of air time and video programs were used as the principal source of information for the course, consisting of fifteen one hour pre-recorded video tapes. Future credit courses will rely less on video programs (i.e. 15 X 30 minute pre-recorded segments) along with print and video material to form a well balanced learning package. This will result in an overall saving since video taped segments are more expensive to produce than print and audio material.

Another problem in the production of distance education material at U.B.C. concerns choosing content from a university calendar that includes over 1,200 courses. Plans are underway to produce a fifteen unit off-campus diploma in education. This program will still enable teachers without a degree to complete their program (approximately twenty percent of the teaching force in B.C. are teaching without a degree), but the major focus will be on practising teachers with a baccalaureate degree who are interested in professional development. This category of teachers constitutes approximately 2/3 of the teachers presently enrolled in U.B.C. off-campus programs. This diploma will consist of three units of course work in each of the three areas listed below: 1) curriculum development, evaluation and implementation; 2) effective schools and effective teaching; 3) peer teaching; and, a six unit component for content up-dates, current issues in education and the introduction of new curriculum areas to practising teachers. This program of studies has flexibiity and at the same time a focus that renders it practical for distance education production. Finally, the strong ratings by practising teachers for the telecourses have prompted the Faculty of Education to experiment with the use of telecourses on-campus using the closed circuit system that has recently been installed which links various campus departments and facilities. Video courses used on campus will be supplemented with small tutorial groups and live, interactive television introducing students to a variety of resource persons. In a preliminary experiment with video tapes on campus as part of a course, the only complaint from students was that it seemed unnecessary to convene the whole class to view the video segments. They argued for greater autonomy in using the pre-recorded material. Autonomy in learning both on and off-campus may be a sign of things to come as educators confront innovations in distance education technology.

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